Claims

1. A conveyor for transporting work pieces in a press, in particular a press line or multiple-die press, from a first station (10) to a second station (20) adjacent to the first station (10), comprising

a) at least one lateral beam (300, 300b, 400) arranged on a side of the press, essentially extending parallel to a transport direction of the conveyor (52, 52b);

b) at least one bar (500) having grippers (502) for gripping the work piece to be transported, whereby the bar (500) is attached to the lateral beam (300, 300b, 400) in such a way that it is movable along a longitudinal extension of the beam (300, 300b, 400); and

c) for each lateral beam (300, 300b, 400) an assembly (100, 200) for supporting the lateral beam (300, 300b, 400);

characterized in that

d) the assembly (100) comprises a pivoting mechanism (106, 107, 108, 109, 301, 302) for pivoting the lateral beam (300) around a horizontal pivotal axis perpendicular to the transport direction; and in that

e) the grippers (502) are rotatably movable for at least compensating a change of orientation of the work piece due to the pivoting of the lateral beam (300, 300b, 400).

2. The conveyor according to claim 1, characterized in that the pivoting mechanism (106, 107, 108, 109, 301, 302) is formed such that the pivotal axis crosses a vertical plane comprising the lateral beam (300), either above, below or through the lateral beam (300), in particular close to a middle portion of the lateral beam (300).

3. The conveyor according to claim 1 or 2, characterized in that it comprises two lateral beams (300, 400) arranged across the press and in that the bar is a cross-bar (500) extending across the press, attached to the two lateral beams (300, 400).

4. The conveyor according to claim 3, characterized in that at least one of the assemblies (100, 200) for supporting one of the two lateral beams (300, 400) is supported such that is relocatable in a direction transverse to the transport direction, in order to adjust a distance between the two lateral beams (300, 400).

5. The conveyor according to one of claims 1 to 4, characterized in that the assembly (100) further comprises a lift mechanism (106, 107, 108, 109, 301, 302) for displacing the lateral beam (300) in a vertical direction.

6. The conveyor according to one of claims 1 to 5, characterized in that the pivoting mechanism (106, 107, 108, 109, 301, 302) comprises two spindles (108, 109) coupled to the lateral beam (300), the spindles (108, 109) being independently operable in order to pivot and preferably vertically displace the lateral beam (300).

7. The conveyor according to claim 6, characterized in that the lateral beam (300) comprises two couplings (301, 302) arranged along the longitudinal extension of the lateral beam (300), preferably symmetrically and close to a center of the lateral beam (300), whereby each of the couplings (301, 302) cooperates with one of the spindles (108, 109).

8. The conveyor according to one of claims 1 to 7, characterized in that the lateral beam (300; 300b) comprises a telescopic drive mechanism (320; 320b; 320c) for the sliding movement of the bar (500).

9. The conveyor according to claim 8, characterized in that the telescopic drive mechanism (320; 320b; 320c) is constituted by a support beam (310; 310b; 310c) attached

to the pivoting mechanism (106, 107, 108, 109, 301, 302), a first carriage (321; 321b; 321c) slidably mounted to the support beam (310; 310b; 310c) and a second carriage (330; 330b) slidably mounted to the first carriage (321; 321b; 321c).

10. The conveyor according to claim 9, characterized in that an intermediate linear guideway (340b; 340.1b, 340.2b; 340.1c, 340.2c) is arranged between the support beam (310b; 310c) and the first carriage (321b; 321c), whereby the guideway (340b; 340.1b, 340.2b; 340.1c, 340.2c) is slidable with respect to the support beam (310b; 310c) as well as to the first carriage (321b; 321c).

11. The conveyor according to one of claims 1 to 10, characterized in that all the drives for (106, 107, 304) moving the bar (500) along the beam (300) as well as for pivoting the beam (300) are stationary in respect of the motion of the bar (500) along the longitudinal extension of the beam (300).

12. A conveyor system for transporting work pieces in a press line or multiple-die press, comprising a plurality of conveyors (51, 52, 53, 54, 55) according to one of claims 1 to 8, arranged consecutively.

13. The conveyor system according to claim 12, characterized in that two consecutive conveyors (52, 52') are arranged such that the work piece (2) may be handed over from a first of the conveyors (52) to a second of the conveyors (52'), whereby the work piece (2) is flipped.

14. A method for transporting work pieces in a press, in particular a press line or multiple-die press, from a first station (10) to a second station (20) adjacent to the first station (10), employing a bar (500) attached to a lateral beam (300, 400) arranged on a side of the press, extending parallel to a transport direction, comprising the steps of:

a) positioning the bar (500) above the work piece (2) situated in the first station (10);

b) lowering the bar (500) by pivoting the lateral beam (300, 400) around a horizontal pivotal axis perpendicular to the transport direction;

c) gripping the work piece (2) by grippers (502) attached to the bar (500);

d) lifting the bar (500) by pivoting the lateral beam (300, 400) around the pivotal axis;

e) transporting the work piece (2) to the second station (20) by moving the bar (500) along a longitudinal extension of the beam (300);

f) positioning the bar (500) in a hand-over position by pivoting the lateral beam (300) around the pivotal axis; and

g) disengaging the work piece (2) from the grippers (502).

15. The method according to claim 14, characterized in that moving the bar (500) along the longitudinal extension of the beam (300) and pivoting, i. e. the lifting and/or lowering and transporting steps, at least partially take place simultaneously.

16. The method according to claim 14 or 15, characterized by the further step of rotatably moving the grippers (502) for at least compensating a change of orientation of the work piece (2) due to the pivoting of the lateral beam (300).

17. The method according to claim 16, characterized in that the second station (52') is another conveyor for further transporting the work piece (2), comprising second grippers and in that the method further comprises the step of rotatably moving the grippers such that the work piece (2) held by the grippers may be directly transferred to the second grippers of the other conveyor (52'), thereby flipping the work piece (2).